

## Unit 1 – Biology

1. Fat, bone and blood are examples of what type of tissue?

- a) epithelial
- b) nervous
- c) muscle
- d) connective

2. This organ system supports, protects and works with muscles to move parts of the body.

- a) integumentary system
- b) skeletal system
- c) nervous system
- d) reproductive system

3. Which of the following is not a phase of mitosis?

- a) Prophase
- b) Anaphase
- c) Telophase
- d) Metaphase
- e) Mesophase

4. Which cell component is responsible for conversion of glucose to a more usable form of energy?

- a) Mitochondria
- b) Golgi Body
- c) Chloroplast
- d) Vacuole
- e) Ribosome

5. Describe what is a tumour and why may it be later diagnosed as cancer?

6. Match the organelles below to their definitions.

\_\_\_\_ Nucleus

A. Storage of sugars and proteins

\_\_\_\_ Ribosomes

B. Converts glucose into energy for the cell.

\_\_\_\_ Endoplasmic reticulum  
for the cell

C. Filaments and tubules that provide a framework

\_\_\_\_ Golgi apparatus

D. Sorts and packages proteins

\_\_\_\_ Chloroplasts

E. Control Centre of the Cell

\_\_\_\_ Mitochondria

F. This is the “goo” that organelles in the cell float

around in

\_\_\_\_ Cytoplasm

G. Creates protein

\_\_\_\_ Cytoskeleton

H. Found only in plant cells, these are responsible

for photosynthesis

\_\_\_\_ Vacuole

I. Connected to the nucleus, this is where ribosomes

hang out

\_\_\_\_ Cell Wall

J. Rigid outer layer of plant cells

7. Explain the functions of xylem and phloem.

8. Animal cells and plants cells have many similarities, and some differences as well. Please list 3 key differences in their structure below.

9. Should certain forms of stem cells (i.e. embryonic) be banned, while others (i.e. umbilical) become/remain funded? Give two points supporting your point of view.

## Unit 2 – Chemistry

1. Which one of the following elements has 5 valence electrons?

- a) boron
- b) lithium
- c) hydrogen
- d) iodine
- e) nitrogen

2. When a chemical reaction takes place, the total mass of the products is always what?

- a) Greater than the total mass of the reactants
- b) Less than the total mass of the reactant
- c) Equal to the total mass of the reactant
- d) Dependent on the type of reaction
- e) Impossible to determine

3. What is another name for a negative ion?

- a) valence electron
- b) ionic compound
- c) anion
- d) cation
- e) stable octet

4. What is the correct chemical formula for Calcium Nitride?

- a) CaN
- b) Ca<sub>2</sub>N
- c) Ca<sub>2</sub>N<sub>3</sub>
- d) Ca<sub>3</sub>N<sub>2</sub>
- e) Ca(NO<sub>3</sub>)<sub>2</sub>

5. Which of the following metals does NOT have more than one possible ion charge?

- a) Mn
- b) Fe
- c) Zn
- d) Cu
- e) Sn

6. Which best describes the pH of acids?

- a) Higher than 0
- b) Lower than 0
- c) Approximately 0
- d) Lower than 7
- e) Higher than 7

7. Which of the following combinations would give a neutralization reaction?

- a)  $\text{LiOH} + \text{Ca}(\text{NO})_2$
- b)  $\text{H}_3\text{PO}_4 + \text{CH}_4$
- c)  $\text{SnI}_6 + \text{BeF}_2$
- d)  $\text{Cu} + \text{AlF}_3$
- e)  $\text{HCl} + \text{Ca}(\text{OH})_2$

Page 4 of 138. Which of the following contributes to making acid rain?

- a)  $\text{N}_2$
- b)  $\text{NH}_3$
- c)  $\text{HBr}$
- d)  $\text{SO}_3$
- e)  $\text{Ca}(\text{OH})_2$

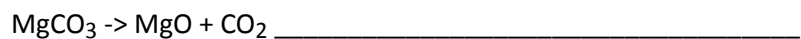
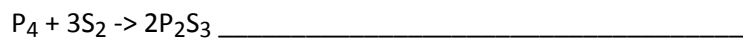
9. Write the name for each of the following compounds.

- a)  $\text{Mg}(\text{ClO})_2$  (ionic) \_\_\_\_\_
- b)  $\text{CuF}_2$  (ionic) \_\_\_\_\_
- c)  $\text{Sb}_2\text{F}_3$  (Covalent/Molecular) \_\_\_\_\_
- d)  $\text{Li}_2\text{SO}_4$  (ionic) \_\_\_\_\_

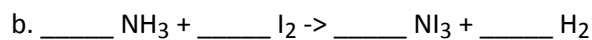
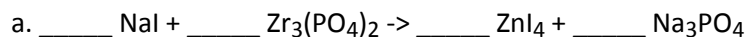
10. Write the chemical formula (balanced) for each compound.

- a) Cesium Chloride (ionic) \_\_\_\_\_
- b) Sodium Carbonate (ionic) \_\_\_\_\_
- c) Manganese (IV) Sulfate (ionic) \_\_\_\_\_
- d) Dihydrogen Disulfide (covalent/molecular) \_\_\_\_\_

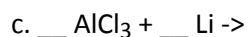
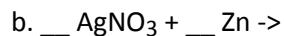
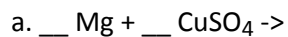
10. Label each chemical reaction as synthesis, decomposition, combustion, single displacement, or double displacement:



Page 5 of 1313. Balance each of the following chemical reactions:



14. Predict the products, write the proper chemical formula for each product, and balance the equation for the following.



### Unit 3 – Climate Change

1. Which of the following is not expected to happen as global temperatures increases?

- a) Increased frequency of severe weather
- b) Sea levels rise
- c) Change in solar constant
- d) Increased carbon dioxide concentrations
- e) Polar ice melts

2. Decreases in precipitation can lead to what?

- a) Desertification
- b) Deforestation
- c) Orographic effect
- d) Thermohaline circulation
- e) None of the above

3. The  $23.5^{\circ}$  tilt of the Earth's axis contributes to creating what?

- a) Increased cloud cover
- b) Night and day
- c) The various seasons
- d) Constant temperatures around globe
- e) None of the above

4. The layer of gases that surrounds a planet or moon is known as the what?

- a) Biosphere
- b) Lithosphere
- c) Hydrosphere
- d) Gaseousphere
- e) Atmosphere

5. Match the following definitions to the corresponding words.

___ Conduction	A) Heat transfer without touching
___ Convection	B) A current of fast-moving air in the upper troposphere
___ Radiation	C) Heat transfer by touching
___ Greenhouse Gas	D) A region that shares plants, animals and climate characteristics
___ Biome	E) Caused by human activity
___ Anthropogenic	F) Heat transfer by motion in gases and liquids
___ Climatograph	G) A representation of precipitation and temperature data
___ Jet Stream	H) Molecules in the atmosphere that trap heat

6.

a) What is the greenhouse effect? You may use a diagram if you wish.

b) What is the difference between the natural and anthropogenic greenhouse effects?

7. What is the albedo effect? Explain how Earth's albedo is expected to change as the Earth warms.

8. Explain how a volcanic eruption in the Philippines can affect temperatures across the entire planet.

Unit 4 – Optics (Knowledge: 19 marks; Inquiry (Thinking): 4 marks; Communication: 0 marks;

Application: 12 marks)

1. A transparent substance has an index of refraction of 2.1. How fast does light pass through this substance?

- a)  $1.4 \times 10^8$  m/s
- b)  $2.1 \times 10^8$  m/s
- c)  $3.0 \times 10^7$  m/s
- d)  $6.3 \times 10^8$  m/s

2. The focal length of a convex mirror is:

- a) 0
- b) the distance to the centre of curvature, C
- c) positive
- d) negative

3. What is a concave mirror?

- a) It is a mirror that has a reflecting surface that curves outward.
- b) It is a mirror with a flat reflecting surface.
- c) It is a mirror that has a reflecting surface that curves inward.
- d) It is a type of mirror that creates an image identical to the object in terms of orientation, size, and location.

4. The phosphor coating inside a fluorescent light bulb absorbs what kind of radiation before emitting it as visible light?

- a) Microwave
- b) Infrared
- c) Visible
- d) Ultraviolet
- e) X-Ray

5. A convex mirror that has a centre of curvature at 24 cm has a focal length of how long?

- a) 24 cm
- b) 12 cm
- c) -24 cm
- d) -12 cm



6. When the image is behind a concave mirror, what is the value of the image distance in the mirror equation?

- a) The image distance,  $d_i$ , is positive.
- b) The image distance,  $d_i$ , is negative.
- c) The image distance,  $d_i$ , is exactly zero.
- d) An image cannot appear behind a concave mirror.

7. What is a spherical aberration?

- a) It is an image that is formed when reflected rays meet.
- b) It is a change in the size of an optically produced image.
- c) It is a type of irregularity in an image seen in a curved mirror.
- d) It is a type of mirror that has a reflecting surface that curves inward.

8. When do spherical aberrations occur?

- a) They occur when reflected rays from the inner parts of the mirror do not go through the focal point.
- b) They occur when reflected rays from the outer parts of the mirror do not go through the focal point.
- c) They occur when reflected rays from the inner parts of the mirror go through the focal point.
- d) They occur when reflected rays from the outer parts of the mirror go through the focal point.

9. What does a negative value of  $h_i$  represent?

- a) inverted image
- b) upright image
- c) real image
- d) virtual image

10. What does a negative value of  $d_i$  represent?

- a) inverted image
- b) upright image
- c) real image
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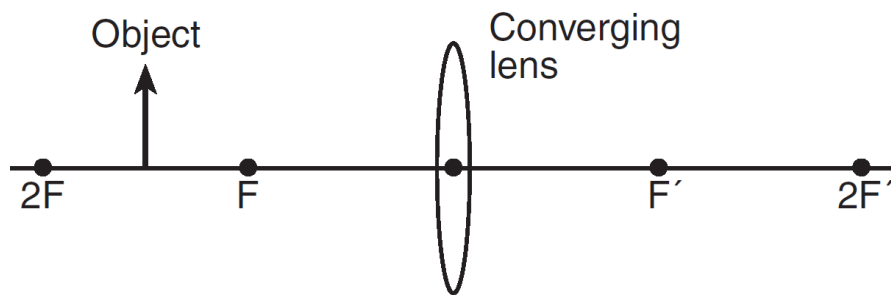
11. What does a negative focal length represent?

- a) convex mirror
- b) concave mirror
- c) negative index of refraction
- d) index of refraction greater than 1

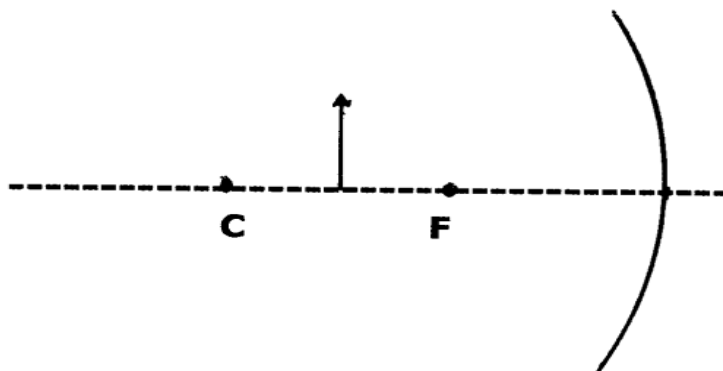
12. Match the following definitions to the corresponding words.

- |                     |   |
|---------------------|---|
| ___ Dispersion      | A) The process of separating colours by refraction                |
| ___ Excited         | B) This describes the state of atoms just after absorbing energy  |
| ___ Inverted        | C) This word describes an image that is upside-down               |
| ___ Incandescence   | D) Light emitted from a high-temperature material                 |
| ___ Fluorescence    | E) Light that is emitted during exposure to UV radiation          |
| ___ Bioluminescence | F) Light produced by a chemical reaction in a living organism     |
| ___ White           | G) Light that is made up of many different colours mixed together |

13. Draw the image. State the Location, Orientation, Size and Type (LOST)



14. Draw the image. State the Location, Orientation, Size and Type (LOST)



15. A 25cm high object is placed 20 cm from a concave mirror with a focal length of 15 cm. Where will the image be located? What is the height of the image? State the four characteristics of the image (LOST).

16. A 9cm high object is placed 3 cm from a concave mirror with a focal length of 6 cm. Where will the image be located? What is the height of the image? State the four characteristics of the image (LOST).